

REMARKS

Claims 25-36 were considered by the Examiner. Claims 25-28, 31-32, and 35-36 are rejected under 35 USC 103(a) as being unpatentable over Usui in view of Pribat (US 4,999,314) and Bozler (US 5,362,682). Claims 29-30 and 33-34 are rejected under 35 USC 103(a) as being unpatentable over Usui in view of Pribat (US 4,999,314) and Bozler (US 5,362,682) as applied to claims 25-28, and further in view of Edmond (US005592501A).

In this response, claim 25 and claim 27 have been amended. Claims 29-36 have been cancelled. New claims 37-56 have been added. Therefore, claims 25-28 and claims 37-56 are pending.

Rejections under 35 U.S.C. 103

Claims 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Usui in view of Pribat (U.S. 4,999,314) and Bozler (U.S. 5,262,682).

Amended claim 25 reads as follows:

25. A semiconductor substrate comprising:
an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing material substantially provided above an opening of the n-th patterned mask; and an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask,

wherein the n-th patterned mask and the (n+1)-th patterned mask are respectively patterned in a stripe shape, and a direction of the stripe of the n-th patterned mask is twisted from a direction of the stripe of the (n+1)-th patterned mask.

Support for amended claim 25 is found, for example, at pages 44-61.

Claim 25 as amended teaches an (n+1)th patterned mask containing a material having a growth suppressing effect, substantially provided above an opening of the nth patterned mask,

wherein the n-th patterned mask and the (n+1)-th patterned mask are respectively patterned in a stripe shape, and a direction of the stripe of the n-th patterned mask is twisted from a direction of the stripe of the (n+1)-th patterned mask. Usui in view of Pribat and Bozler do not teach or suggest, either alone or in combination, an (n+1)th patterned mask containing a material having a growth suppressing effect substantially provided above an opening of the nth patterned mask, wherein the n-th patterned mask and the (n+1)-th patterned mask are respectively patterned in a stripe shape, and a direction of the stripe of the n-th patterned mask is twisted from a direction of the stripe of the (n+1)-th patterned mask.

Usui teaches a silicon dioxide mask on a GaN layer grown on a sapphire substrate.

Bozler teaches a growth mask with openings formed on a substrate.

Pribat at Figure 54 and column 12 teaches on a substrate a first insulation layer with openings and a second insulation layer with openings. The first and second insulation layers are achieved by a dielectric material. However, Pribat does not teach the second insulation layer provided substantially above the openings of the first insulation layer wherein the first and second insulation layer are respectively patterned in a stripe shape, and a direction of the stripe shape of the first insulation layer is twisted from a direction of the stripe of the second layer.

Thus, at least for the foregoing reasons, applicant respectfully submits that Usui in view of Pribat and Bozler do not teach or suggest all of the elements of claim 25.

Claims 26, 39, 42, 45, 48, 51, and 54

Claim 26 is dependent on claim 25. Therefore, it is respectfully submitted that claim 26 is patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 25. Accordingly, Applicant requests withdrawal of the rejection of claim 26.

Claims 39, 42, 45, 48, 51, and 54 are dependent on claim 25. Therefore, it is respectfully submitted that claims 39, 42, 45, 48, 51, and 54 are patentable at least for the reasons set forth above with respect to the patentability of claim 25.

Amended claim 27 reads as follows:

27. A semiconductor substrate comprising:
an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be *at an angle of about 90° or 120°* relative to the n-th patterned mask; and
an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask.

Support for amended claim 27 can be found in the specification, for example, at pages 44-67. Claim 27 teaches an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be at an angle at an angle of about 90° or 120° relative to the n-th patterned mask. Usui in view of Pribat and Bozler do not teach or suggest, either alone or in combination, an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be at an angle of about 90° or 120° relative to the n-th patterned mask. The addition of the language “of about 90° or 120°” is intended to clarify the existing claim language and does not raise new issues not previously considered by the Examiner.

Thus, at least for the foregoing reasons, applicant respectfully submits that Usui in view of Pribat and Bozler do not teach or suggest all of the elements of claim 27.

Claims 28, 40, 43, 46, 49, 52, and 55

Claim 28 is dependent on claim 27. Therefore, it is respectfully submitted that claim 28 is patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with

respect to the patentability of claim 27. Accordingly, Applicant requests withdrawal of the rejection of claim 28.

Claims 40, 43, 46, 49, 52, and 55 are dependent on claim 27. Therefore, it is respectfully submitted that claims 40, 43, 46, 49, 52, and 55 are patentable at least for the reasons set forth above with respect to the patentability of claim 27.

New claim 37 reads as follows:

37. A semiconductor substrate comprising:
an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing material substantially provided above an opening of the n-th patterned mask; and an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask,
wherein the first to (n+1)-th patterned masks are patterned in such a manner that a combination of the first to (n+1)-th patterned masks covers the entire surface of the lower substrate.

Support for new claim 37 can be found in the specification, for example, at pages 55-56. Claim 37 teaches an (n+1)-th patterned mask containing a material having a growth suppressing material substantially provided above an opening of an n-th patterned mask, wherein the first to (n+1)-th patterned masks are patterned in such a manner that a combination of the first to (n+1)-th patterned masks covers the entire surface of the lower substrate. Usui in view of Pribat and Bozler do not teach or suggest, either alone or in combination, an (n+1)-th patterned mask containing a material having a growth suppressing effect, wherein the first to (n+1)-th patterned masks are patterned in such a manner that a combination of the first to (n+1)-th patterned masks covers the entire surface of the lower substrate.

Thus, at least for the foregoing reasons, applicant respectfully submits that new claim 37 is in condition for allowance.

Claims 38, 41, 44, 47, 50, 53, and 56

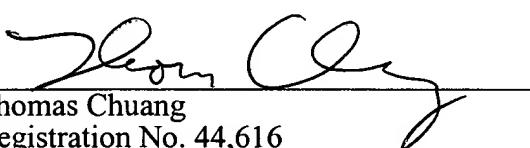
Claims 38, 41, 44, 47, 50, 53, and 56 are dependent on claim 37. Therefore, it is respectfully submitted that claims 38, 41, 44, 47, 50, 53, and 56 are patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 37.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 299002048410.

Respectfully submitted,

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25. (Twice Amended) A semiconductor substrate comprising:
an n-th patterned mask containing a material having a growth suppressing effect,
provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the
n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing material
substantially provided above an opening of the n-th patterned mask; and an (n+1)-th nitride
semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned
mask,
wherein the n-th patterned mask and the (n+1)-th patterned mask are respectively
patterned in a stripe shape, and a direction of the stripe of the n-th patterned mask is twisted from
a direction of the stripe of the (n+1)-th patterned mask.

27. (Amended) A semiconductor substrate comprising:
an n-th patterned mask containing a material having a growth suppressing effect,
provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the
n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing effect,
provided so as to be at an angle of about 90° or 120° relative to the n-th patterned mask; and
an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via
the (n+1)-th patterned mask.

Please add new claims 37-56 as follows:

37. (New) A semiconductor substrate comprising:

an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more; an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;

an (n+1)-th patterned mask containing a material having a growth suppressing material substantially provided above an opening of the n-th patterned mask; and an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask,

wherein the first to (n+1)-th patterned masks are patterned in such a manner that a combination of the first to (n+1)-th patterned masks covers the entire surface of the lower substrate.

38. (New) A light emitting device produced by using the semiconductor substrate of claim 37.

39. (New) A semiconductor substrate according to claim 25, wherein a width of the stripe of the (n+1)-th patterned mask is equal to or larger than a width of the stripe of the n-th patterned mask.

40. (New) A semiconductor substrate according to claim 27, wherein a width of the stripe of the (n+1)-th patterned mask is equal to or larger than a width of the stripe of the n-th patterned mask.

41. (New) A semiconductor substrate according to claim 37, wherein a width of the stripe of the (n+1)-th patterned mask is equal to or larger than a width of the stripe of the n-th patterned mask.

42. (New) A semiconductor substrate according to claim 25, wherein the n-th nitride semiconductor crystal layer is made of AlGaN or InGaN.

43. (New) A semiconductor substrate according to claim 27, wherein the n-th nitride semiconductor crystal layer is made of AlGaN or InGaN.

44. (New) A semiconductor substrate according to claim 37, wherein the n-th nitride semiconductor crystal layer is made of AlGaN or InGaN.

45. (New) A semiconductor substrate according to claim 25, wherein a stripe width of the second mask is smaller than each opening of the first mask.

46. (New) A semiconductor substrate according to claim 27, wherein a stripe width of the second mask is smaller than each opening of the first mask.

47. (New) A semiconductor substrate according to claim 37, wherein a stripe width of the second mask is smaller than each opening of the first mask.

48. (New) A semiconductor substrate according to claim 25, wherein the n-th, and (n+1)-th are formed of the same material.

49. (New) A semiconductor substrate according to claim 27, wherein the n-th, and (n+1)-th are formed of the same material.

50. (New) A semiconductor substrate according to claim 37, wherein the n-th, and (n+1)-th are formed of the same material.

51. (New) A semiconductor substrate according to claim 25, wherein the thickness of the n-th and (n+1)-th masks are the same as each other.

52. (New) A semiconductor substrate according to claim 27, wherein the thickness of the n-th and (n+1)-th masks are the same as each other.

53. (New) A semiconductor substrate according to claim 37, wherein the thickness of the n-th and (n+1)-th masks are the same as each other.

54. (New) A semiconductor substrate according to claim 25, wherein the lower substrate is GaN.

55. (New) A semiconductor substrate according to claim 27, wherein the lower substrate is GaN.

56. (New) A semiconductor substrate according to claim 37, wherein the lower substrate is GaN.